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STATEMENT OF ADDED WORK 14-CHANNEL DATA-  
REDUCTION EQUIPMENT FOR SYSTEM 4

The Contractor proposes to supply added engineering services, and material to perform the following work in addition to that originally proposed for the 14-channel data-reduction system for use with System 4 magnetic tape recordings:

1. Modification of Ampex Playback Tape Transport (G Rack)

Two major modifications are required of the standard Ampex 300-14R tape transport employed as the playback transport. 14" reels are to be used rather than the 10-1/2" reels for which the transport is designed, necessitating redesign of the top plate and investigation of the torque characteristics of the take-up and supply reel motors. The second modification is occasioned by the use of one-mil mylar recording tape, whose use on a nonmodified transport results in improper tape guidance. The flexibility and relative thinness of this tape results in curling of the tape edge at the tape guides. Experimental investigation of this problem is being undertaken, involving considerable effort, which indicates that the addition of idlers and guides will provide a solution. Other possible solutions which have been studied include a servo control system and a method involving an air cushion idler.

2. Monitor Chassis (G Rack)

The playback amplifier assembly is being expanded to include an output switching circuit, which permits the selection of any two of the 14 channels for rerecording on three-channel duplicators, and selection of any two of the 14 channels for aural monitoring. A 14-pole switching and mixing circuit is required, including a dummy load which is used in lieu of a duplicator in the event that only one duplicator is employed. An erase amplifier is required when the output of the amplifiers is being fed to three-channel duplicators. A second

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addition to the amplifier assembly is required by the need to process auxiliary data recorded on channels 13 and 14. This involves an additional amplifier, output terminals and cabling, and a circuit which inserts an 8-db notch in the time-reference tone originally recorded on channel 14.

3. Power Switch Panels (All Racks)

Power switch panels are being added to all racks to provide automatic system control as well as individual equipment control. Included in the switch panel units are protection circuits which provide an alarm and stop system operation in the event of troubles, such as tape breakage or other malfunction.

4. Addition of Blower Assembly for Air Cooling (G Rack)

A high volume blower unit and associated ducting are being added in three of the four racks constituting the 14-channel system to provide dissipation of the heat generated by the 14 amplifiers, the multiple power supplies, and extensive control circuitry, and to provide air filtering.

5. Addition of Power Supply Cabinet (J Rack)

Power supply requirements have increased substantially due to circuit additions in the amplifier assembly and in the amplifiers themselves. Two large plate supplies and two d-c filament supplies are required. These supplies are commercially available units modified to meet the present requirement. An additional rack for housing these supplies is required.

6. Addition of Timing Control Equipment (K Rack)

A transport sequence control unit with associated power supply, and an aural readout unit are being added to the 14-channel system. These additions, as well as the time-mark generator unit, are to be housed in a fourth separate rack. Although these units were developed for the 3-channel system, additional design time is required on the 14-channel program for cabinet design, wiring layout, and for minor circuit changes within the time-mark generator chassis. This latter

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modification involves the provision of a 10-second keying signal for the notch circuit, mentioned in paragraph 2, which is being added to the monitor chassis, and a one-minute signal which actuates both the aural readout and the event marker.

7. Inter-unit Cabling within the G and H Racks

The addition of switch panels and added system functions increases the wiring complexity of the two original racks and increases the design time required.

8. Added Complexity of Interconnection as a Result of Four Instead of Two Cabinets

The added system function and the increase in the number of racks of the system from two to four increases the bulk and complexity of inter-cabinet connections and cabling about threefold.

9. Additions to Technical Manuals

Substantial increases in scope and additions to the technical manuals are necessitated by the increased complexity of the data-reduction equipment.

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